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/David J. McKenzie/
Attorney for Applicant

PATENT
Docket No. SJO920000065US1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Vladimir Nikitin et al.	)
Serial No.:	10/087,332	)
Filed:	March 1, 2002	) Group Art
For:	**REDUCTION OF INTERFERENCE PICKUP IN HEADS FOR MAGNETIC RECORDING BY MINIMIZING PARASITIC CAPACITANCE**	) Unit: 2652
Examiner:	Davis, Donald D.	)

APPELLANTS' SUPPLEMENTAL APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The USPTO received Appellants' timely Appeal Brief on February 22, 2005 and Notice of Appeal on June 25, 2004. The Notice of Appeal was filed in response to the Final Office Action mailed March 24, 2004. In response to the Appeal Brief, the Examiner reopened prosecution and issued a Final Office Action mailed May 18, 2005. The Final Office Action included a new ground of rejection, but was not necessitated by an amendment or based on an information disclosure statement. Based on the Final Office Action and the Examiner's reliance on 37 C.F.R. §1.193(b)(2), Appellants considered the reopened prosecution and Final Office

Action a written statement in answer to Appellant's brief (an Examiner's answer) under 37 C.F.R. §1.193(b)(2) and 37 C.F.R. §41.39. Therefore, Appellant filed a supplemental appeal brief in compliance with 37 CFR 41.39(b)(2) on June 30, 2005. Appellants contended that reopening prosecution is an unnecessary waste of time and money, and that making the first action final based on a new ground of rejection is improper. Appellants reiterated all of the applicable arguments presented in Appellants Appeal Brief of February 22, 2005.

In response to a status request filed March 23, 2006, Appellants received a notice of non-compliant appeal brief because the supplemental appeal brief was inadvertently filed without a signature and because the new rule changes required filing of a new appeal brief and new notice of appeal. Consequently, Appellants filed a new appeal brief with an accompanying notice of appeal.

The USPTO received Appellants' timely Appeal Brief and Notice of Appeal on November 17, 2006. In response, the Examiner issued an Office Action mailed February 22, 2007. The Office Action did not state that the Examiner was reopening prosecution; therefore, Appellants presume that the Office Action was intended as an Examiner's Answer to the Appeal Brief filed on November 17, 2006 under 37 C.F.R. §1.193(b)(2) and 37 C.F.R. §41.39. Appellants' again submit that reopening prosecution is an unnecessary waste of time and money.

The Examiner's Answer again included a new ground of rejection based on a newly cited piece of art, in spite of the direction in the MPEP that "New grounds of rejection in an examiner's answer are envisioned to be rare, rather than a routine occurrence." (MPEP 1207.03). Consequently, Appellants filed a new Appeal Brief on April 23, 2007, reiterating applicable arguments of previous Appeal Briefs and addressing new grounds of rejection below in Section 7 as set forth in 37 C.F.R. §41.37(c)(1)(vii). On June 4, 2007 the Patent Office mailed a Notification of Non-Compliant Appeal Brief and gave one month to respond. This revised Appeal Brief responds by stating which claims are under appeal as required by 37 C.F.R. § 41.37(c)(1)(iii). The Applicants believe that section 3 below, Status of Claims, corrects the non-compliance problems noted in the Notification of Non-Compliance.

The USPTO issued a Notification of Non-Compliance mailed Oct. 9, 2007 indicating that Appellants had not presented an argument under a separate heading for each ground of rejection on appeal (37 C.F.R. §41.37(c)(1)(vii)). The Applicants believe that section 7 below,

Arguments, corrects the non-compliance problems noted in the Notification of Non-Compliance. In particular, arguments for issues that were previously incorporated by reference are now explicitly included. Appellants request that the Patent Office contact the undersigned if any further problems are noted. The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication, or to credit any overpayment, to Deposit Account No. 09-0466.

1. REAL PARTY IN INTEREST

The real party in interest is the assignee, International Business Machines Corporation, Armonk, New York.

2. RELATED APPEALS AND INTERFERENCES

Other than the Appeal Briefs filed February 22, 2005 and November 17, 2006, there are no related appeals or interferences.

3. STATUS OF CLAIMS

The Applicants respectfully appeal the rejection of Claims 1-25. The Final Office Action mailed March 24, 2004 rejected Claims 1-25 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,807,073 to Takeura et al. (hereinafter "Takeura") in view of U.S. Patent No. 5,048,175 to Jurisch et al. (hereinafter "Jurisch"). Given that the Examiner failed to cite Takeura and Jurisch in the new Office Action mailed February 22, 2007, Appellants consider these rejections withdrawn. Nevertheless, to the extent that the Examiner might argue that these rejections are still relevant, Appellants maintain and incorporate by reference the arguments presented in the Appellant's Appeal Brief of February 22, 2005.

The second Final Office Action mailed May 18, 2005 issued a new ground of rejection in response to the Appeal Brief filed on February 22, 2005. The second Final Office Action rejected Claims 1-3, 5-7, 14, 16, and 23-25 under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,966,800 to Huai et al. (hereinafter "Huai") and also rejected Claims 4, 8-13, 15, and 17-22 under 35 U.S.C. § 103(a) as obvious in view of Huai. Given that the Examiner failed to cite Huai in relation to rejections under 35 U.S.C. § 102(b) or as a sole ground of rejection under 35 U.S.C. § 103(a), Appellants consider these rejections withdrawn. Nevertheless, to the extent that the Examiner might argue that these rejections are still relevant, Appellants maintain and incorporate by reference the arguments presented in the Appellant's Appeal Brief of November 17, 2006.

The new Office Action mailed on February 22, 2007 issued a new ground of rejection in response to the Appeal Brief filed on November 27, 2006. The new Office Action rejected Claims 1-5, 8, 14, 16, and 23-25 under 35 U.S.C. §102(b) as being unpatentable over U.S. Patent

No. 5,805,390 to Takeura (hereinafter "Takeura II"), also rejected Claims 6 and 7 under 35 U.S.C. §103(a) as being unpatentable over Takeura II in view of Huai, and also rejected Claims 9-13, 15, and 17-22 under 35 U.S.C. §103(a) as being unpatentable over Takeura II.

4. STATUS OF AMENDMENTS

Appellants filed an amendment subsequent to receipt of the final rejection mailed March 24, 2004. The amendment was entered for purposes of this appeal, as noted in the Advisory Action mailed June 16, 2004. A copy of the claims is included in Section 9, Claims Appendix.

In the Appeal Brief received by the USPTO February 22, 2005, Appellants proposed an amendment to claim 15 to replace "~~Further comprising an~~ electrical contact ~~having~~" with "wherein the electrical contact pad has." This amendment was proposed to address readability of the preamble and antecedent basis agreement with Claim 1, but was apparently not entered. However, since this proposed amendment is now not permitted under 37 C.F.R. 41.39(b)(2) or 37 C.F.R. 41.37(c), Appellants have removed the proposed amendment and request that the informality relating to antecedent basis be addressed once Claim 15 is allowed.

5. SUMMARY OF CLAIMED SUBJECT MATTER

Magnetoresistive (MR) and giant magnetoresistive (GMR) heads used in data storage drives may be subject to interference noise. This noise may reduce the quality of the data read from a tape storage device or a hard disk drive. As the interference noise increases, the signal-to-noise ratio (SNR) decreases and the quality of the detected read signal decreases. *See*, Background, pages 1-2. The interference noise may be due, at least in part, to ambient radio frequency (RF) energy, which may originate from external (e.g., radio and/or television station broadcasts) or internal (e.g., storage drive motors and/or electronics) sources. Summary, page 4, lines 7-15. Various embodiment disclosed in the present application reduce the effects of interference noise by reducing the capacitance of various head elements within a storage drive. Summary, page 4, lines 16-19.

One embodiment includes a magnetic head 600 having a material 602, which has a low dielectric constant, interposed between a substrate 614 and an electrical contact pad 610. The

electrical contact pads 610 are the read and write elements through which a storage drive reads and writes data to/from the storage device. The low dielectric material 602 reduces the parasitic capacitive coupling between the substrate 614 and the contact pad 610, thereby improving the quality of the signal at the contact pad 610. Detailed Description, page 10, line 26 through page 11, line 12. In particular, independent Claim 1 recites an electrical contact pad, a substrate, an insulating undercoat, and a low dielectric material. The electrical contact pad 610 (See Fig. 6, Specification page 10, lines 5-8) represents one example of the electrical contact pad recited in Claim 1. The substrate 614 (See Fig. 6, Specification page 10, lines 9-13) represents one example of the substrate recited in Claim 1. The insulating undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of the insulating undercoat recited in Claim 1. The low dielectric material 602 (See Fig. 6, Specification page 10, line 26- page 11, line 8) represents one example of the low dielectric material recited in Claim 1.

The following quotation of Claim 1 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 1 in compliance with 37 CFR 41.37(c)(1)(v).

1. A magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:

an electrical contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9);

a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) is formed;

an insulating undercoat (See Fig. 6, element 608, Specification page 10, lines 23-25) interposed between the pad and the substrate; and

a material (See Fig. 6, element 602, Specification page 10, line 26- page 11, line 8) selected to have a low dielectric constant interposed between the pad and the insulating undercoat.

Another embodiment includes a reduced capacitance magnetic head 600 having a contact pad, a substrate, a conducting layer, a low dielectric material, and a conducting stud. Detailed Description, page 10, lines 5-14. The electrical contact pad 610 (See Fig. 6, Specification page 10, lines 5-8) represents one example of the electrical contact pad recited in Claim 16. The substrate 614 (See Fig. 6, Specification page 10, lines 9-13) represents one example of the substrate recited in Claim 16. The insulating undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of the insulating layer recited in Claim 16. The low

dielectric material 602 (See Fig. 6, Specification page 10, line 26- page 11, line 8) represents one example of the low dielectric material recited in Claim 16. The stud 604 (See Fig. 6, Specification page 10, line 26- page 11, line 8) represents one example of the conducting stud recited in Claim 16.

The following quotation of Claim 16 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 16 in compliance with 37 CFR 41.37(c)(1)(v).

16. A reduced capacitance magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:
an electrical contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9);
a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head is formed;
an insulating layer (See Fig. 6, element 608, Specification page 10, lines 23-25) formed over the substrate;
a low dielectric material (See Fig. 6, element 602, Specification page 10, line 26- page 11, line 8) interposed between the pad and the substrate which is used as a platform for the electrical contact pad to increase the distance between the substrate and the electrical contact pad, the low dielectric material comprising hard bake photo resist (See Fig. 6, Specification page 10, lines 8-9, page 11, lines 8-12) and having a thickness of about 20 μm and a dielectric constant of about 3; and
a conducting stud (See Fig. 6, element 604, Specification page 10, lines 9-14) formed through the low dielectric material to make electrical connection between the electrical contact pad and the insulating layer.

Another embodiment includes a disk drive system that includes a reduced capacitance magnetic head 600 having a contact pad, a substrate, a low dielectric material, a magnetic recording disk, a spin-valve sensor, and a detector. Detailed Description, page 7, lines 2-6, page 10, lines 5-14. The electrical contact pad 610 (See Fig. 6, Specification page 10, lines 5-8) represents one example of the electrical contact pad recited in Claim 17. The substrate 614 (See Fig. 6, Specification page 10, lines 9-13) represents one example of the substrate recited in Claim 17. The insulating undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of the insulating layer recited in Claim 17. The low dielectric material 602 (See Fig. 6, Specification page 10, line 26- page 11, line 8) represents one example of the low dielectric material recited in Claim 17. The magnetic recording disk 104 (See Fig. 1, Specification page 7,

lines 2-4) represents one example of the magnetic recording disk. The spin-valve sensor, actuator, and detector are known in the art.

The following quotation of Claim 17 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 17 in compliance with 37 CFR 41.37(c)(1)(v).

> 17. A disk drive system comprising a reduced capacitance magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:
>
> an electrical contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9);
>
> a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head is formed;
>
> an insulating undercoat (See Fig. 6, element 608, Specification page 10, lines 23-25) interposed between the pad and the substrate;
>
> a material (See Fig. 6, element 602, Specification page 10, line 26- page 11, line 8) selected to have a low dielectric constant interposed between the pad and the insulating undercoat;
>
> a magnetic recording disk (See Fig. 1, element 104, Specification page 7, lines 2-4);
>
> a spin-valve sensor for reading data recorded on the recording disk; and
>
> an actuator for moving the spin valve sensor across the magnetic recording disk in order for the spin-valve sensor to access different magnetically recorded data on the magnetic recording disk; and
>
> a detector electrically coupled to the spin-valve sensor and configured to detect changes in resistance of the sensor caused by rotation of the magnetization of the sensing layer relative to the fixed magnetizations of the pinned layer in response to changing magnetic fields induced by the magnetically recorded data.

Another embodiment includes a magnetic head 600 having a contact pad 610 of a reduced size. The reduced surface area of the contact pad 610 minimizes the parasitic capacitance between the substrate 614 and the contact pad 610. Detailed Description, page 10, lines 5-14. In particular, Claim 22 recites a substrate and a contact pad of reduced surface area. The substrate 614 (See Fig. 6, Specification page 10, lines 9-14) represents one example of the substrate recited in Claim 22. The electrical contact pad 610 (See Fig. 6, Specification page 10, lines 5-8) represents one example of the electrical contact pad recited in Claim 22.

The following quotation of Claim 22 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 22 in compliance with 37 CFR 41.37(c)(1)(v).

22. A reduced capacitance magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:

a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head is formed;

an contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9) disposed above the substrate and having a surface area of less than about 20 μm in order to reduce capacitance coupling with the substrate.

Another embodiment includes a magnetic head 600 having a substrate, an alumina undercoat layer, a contact pad, and a layer of alumina between the electrical contact pad and the alumina undercoat layer. Detailed Description, page 10, lines 5-14. The substrate 614 (See Fig. 6, Specification page 10, lines 9-14) represents one example of the substrate recited in Claim 23. The undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of the alumina undercoat layer recited in Claim 23. The layer of alumina interposed between the electrical contact pad and the alumina undercoat layer recite in Claim 23 represent one example of "a manner of achieving a greater separation between the contact pads 610 and the substrate material 614..." (See Fig. 6, Specification page 10, lines 17-18).

The following quotation of Claim 23 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 23 in compliance with 37 CFR 41.37(c)(1)(v).

23. A magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:

a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head is formed;

an alumina undercoat layer comprising Al_2O_3 formed over the substrate;

an electrical contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9); and

a layer of alumina interposed between the electrical contact pad and the alumina undercoat layer.

Another embodiment includes a magnetic head 600 having a contact pad 610 that is separated from the substrate 614 by an insulating undercoat 608 of increased thickness. Detailed Description, page 10, lines 15-22. In particular, Claim 24 recites a substrate, an insulating undercoat layer, an electrical contact pad, and another layer of SiO2. The substrate 614 (See Fig. 6, Specification page 10, lines 9-14) represents one embodiment of the substrate recited in Claim 24. The insulating undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of the insulating undercoat layer and the additional layer of SiO2 recited in Claim 24.

The electrical contact pad 610 (See Fig. 6, Specification page 10, lines 5-8) represents one example of the electrical contact pad recited in Claim 24.

The following quotation of Claim 24 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 24 in compliance with 37 CFR 41.37(c)(1)(v).

24. A magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:

a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head is formed;

an alumina undercoat layer comprising SiO_2 formed over the substrate;

an electrical contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9); and

a layer of alumina interposed between the electrical contact pad and the alumina undercoat layer.

Another embodiment includes a method of reducing capacitance in a magnetic head 600 by isolating the read/write head from the substrate to reduce capacitance coupling. Detailed Description, page 10, lines 15-22. In particular, Claim 25 recites providing a substrate and a read/write head and isolating the read/write head from the substrate to reduce capacitance coupling. The substrate 614 (See Fig. 6, Specification page 10, lines 9-14) represents one example of a substrate provided in Claim 25. The read contact layers 218 and write contact layers 206 (See Fig. 6, Specification page 7, lines 19-24) represents one example of the read/write head recited in Claim 25. The insulating undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of isolating the read/write head from the substrate recited in Claim 25.

The following quotation of Claim 25 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 25 in compliance with 37 CFR 41.37(c)(1)(v).

25. A method for reducing capacitance in a magnetic head, (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:

providing a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19);

providing a read/write head (See Fig. 6, elements 218 and 206 Specification page 7, lines 19-24); and

isolating (See Fig. 6, element 206 Specification page 10, lines 15-25) the read/write head from the substrate in order to reduce the capacitance coupling between the read head and the substrate.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Issue I is addressed in the Appellants' Appeal Brief of February 22, 2005 and incorporated by reference. Issues II and III are addressed in the Appellants' Appeal Brief of November 17, 2006 and incorporated by reference. Given that the rejections relating to issues I-III are considered withdrawn, those issues are only referenced here in the event the Examiner asserts that those rejections are not withdrawn. Issues IV, V, and VI address the new rejections raised in the new Office Action.

I. Whether the Examiner failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for Claims 1-25 where the limitations of the claims are not taught within the combination of cited references?

II. Whether the Examiner failed to establish a *prima facie* case of anticipation under 35 U.S.C. § 102(b) for claims 1-3, 5-7, 14, 16, and 23-25 where the limitations of the claims are not taught by the cited reference?

III. Whether the Examiner failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claims 4, 8-13, 15, and 17-22 where the limitations of the claims are not taught or suggested within the combination of cited references?

IV. Whether the Examiner failed to establish a *prima facie* case of anticipation under 35 U.S.C. § 102(b) for claims 16 and 24 where the limitations of the claims are not taught by the cited reference?

V. Whether the Examiner failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claims 6 and 7 where the limitations of the claims are not taught or suggested within the combination of cited references?

VI. Whether the Examiner failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claims 9-12, 15, and 17-22 where the limitations of the claims are not taught or suggested within the cited reference?

7. ARGUMENT

I. The Examiner failed to establish a *prima facie* case of obviousness because the cited references, either alone or in combination, do not teach or suggest all of the limitations of Claims 1-25.

The corresponding part of the Appeal Brief of February 22, 2005, to the extent it may be applicable, is incorporated by reference. For the Board's convenience, the relevant portion of the Appeal Brief of February 22, 2005 is included here, with the addition of some subheadings.

Appellants respectfully assert that neither Takeura nor Jurisch, alone or in combination, teaches or suggests the low dielectric material (or material selected to have a low dielectric, or species thereof) claimed in independent claims 1, 16, 17, 23, 24, and 25 of the present application.

The Advisory Action dated June 16, 2004 states that the final rejection of record is maintained, but states no further reasoning in support of the final rejection. The Final Office Action states:

> Takeura et al shows in figure 5 a magnetic head including an electrical contact pad 3; a substrate 14 on which the magnetic head is formed; and **an insulating undercoat 13** interposed between the pad and the substrate 14. The **low dielectric material 13** of Takeura et al is configured to decrease the parasitic capacitance of the magnetic head.

Final Office Action, 03/24/04, page 2 (emphasis added). The Final Office Action also states:

> However, Takeura et al is **silent as to dielectric material** and electrical conductive (e.g. copper, Cu) studs formed through dielectric material.

Final Office Action, 03/24/04, page 3 (emphasis added).

These two statements within the Final Office Action are inconsistent. It is impossible for Takeura to both disclose a low dielectric material and be silent as to the low dielectric material. Appellants agree with the Examiner's second statement—that Takeura is silent as to the low dielectric material claimed in the present application. It appears that the first statement—that

Takeura discloses a low dielectric material—is a "leftover" from the first Office Action mailed on September 30, 2003.[1]

However, if the Examiner asserts that Takeura discloses both an insulating undercoat 13 and a low dielectric material 13, Appellants respectfully disagree with the Examiner's mischaracterization of the cited reference. As stated in previous responses to the first and Final Office Actions, Takeura discloses only an insulating film 13. Takeura, col. 7, line 64 through col. 8, line 3; fig. 5. Takeura only discloses a single layer. If Takeura were to disclose the insulating film 13 as the low dielectric material claimed in the present application, then Takeura provides no disclosure of the claimed insulating undercoat. Alternately, if the insulating film 13 in Takeura were the claimed insulating undercoat of the present invention, Takeura fails to disclose the claimed low dielectric material.

It may be that the examiner considers the insulating film 13 of Takeura to serve as both of these layers. Nevertheless, Takeura's teachings are insufficient to teach the entirety of the claim 1, as required for a *prima facie* case of obviousness. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1576 (Fed. Cir. 1987). The insulating undercoat, as shown in Figure 6 of the present application, serves to insulate the active elements of the magnetic head. As such, it is formed under the active components of the magnetic head. Detailed Description, page 7, lines 13-17. In contrast, the low dielectric material is interposed between the pad and the insulating undercoat. Consequently, the low dielectric material forms a separate layer from the insulating undercoat. The insulating film 13 disclosed in Takeura cannot be interpreted as both the insulating undercoat and the low dielectric material interposed between the contact pads and the insulating undercoat. A single layer cannot be interposed between itself and another layer.

Therefore, Takeura fails to disclose all of the features of claim 1 and the Examiner fails to establish a *prima facie* case of obviousness based on the disclosure of Takeura alone. Appellants believe that the Examiner acknowledges this through the Examiner's second, more recent statement that Takeura is silent as to the low dielectric material of the present application.

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[1] Language similar to the first statement was employed in a rejection of claims 1, 2, 6, 7, 14, and 23-25 under 35 U.S.C. § 102 (b) in the first Office Action dated September 30, 2003. The Examiner subsequently withdrew the rejection under 35 U.S.C. § 102(b), but apparently left substantially similar language in the Final Office Action, even though no rejection is presented under 35 U.S.C. § 102(b).

Nevertheless, in order to ensure a complete response, Appellants respectfully reassert that Takeura fails to disclose this claim limitation.

With regard to the combined references, the Final Office Action states:

> Jurisch et al shows in figure 1, for example, electrical conductive, such as copper (see column 5, lines 44-45) studs formed through **dielectric material**. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to provide the magnetic head of Takeura et al with electrical conductive (e.g. Cu) studs formed through **dielectric material as taught by Jurisch et al**.

Final Office Action, 03/24/04, pages 3-4 (emphasis added).

Again, Appellants respectfully disagree with the Examiner's mischaracterization of the cited reference. Jurisch does not teach or suggest a low dielectric material as claimed in the present application. Rather Jurisch discloses a thin film magnetic head 10 having a substrate 12 and a core 14. Jurisch, col. 2, lines 33-35; fig. 1. The substrate 12 and core 14 are separated by a single insulating base coat 36. Jurisch, col. 2, lines 54-55; fig. 1. A conductive stud 40 extends through the base coat 36 between the substrate 12 and the core 14, forming an electrical circuit between the substrate 12 and the core 14. Jurisch, col. 2, lines 63-68.

Although the Examiner fails to explicitly point out which teaching of Jurisch discloses the low dielectric material of the present application, it appears that the Examiner considers the base coat 36, through which the stud 40 extends, to be the same as the low dielectric material claimed in the present application. If any comparison is to be made between Jurisch and the present application, the base coat 36 is potentially more similar to the insulating undercoat of the present application than it is to the low dielectric material. Even if the base coat 36 of Jurisch were identical to the insulating undercoat claimed in the present application, Jurisch provides no disclosure of the claimed low dielectric material interposed between the electrical contact pad and the insulating undercoat. Alternately, if the base coat 36 in Jurisch were the claimed low dielectric material of the present invention, Jurisch fails to disclose the claimed insulating undercoat. Jurisch simply does not disclose a low dielectric material separate from the base coat 36. Jurisch, like Takeura, discloses only a single layer. Therefore, the combination of the base coat 36 of Jurisch and the teachings of Takeura are insufficient to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a).

Given that a rejection under 35 U.S.C. § 103(a) is only appropriate where all of the claim limitations are taught or suggested by the cited references, according to MPEP § 2143.03, and the Examiner has not shown that the cited references teach or suggest all of the claim limitations, Appellants respectfully assert that claim 1 is patentable over the combination of cited references. Appellants also submit that independent claims 16, 17, 23, 24, and 25 are patentable because each of these claims contains a similar limitation and/or recites further limitations not disclosed or taught by the cited references.

CLAIM 16

Specifically, claim 16 recites certain characteristics of the claimed low dielectric material. Claim 16 also recites a conducting stud formed through the low dielectric material to make electrical connection between the electrical contact pad and the insulating layer. Appellants respectfully submit that the Office Action's assertions are erroneous that Jurisch teaches a conductive stud as claimed. Rather Jurisch teaches a conductive stud 40 extending through the base coat 36 between the base substrate 12 and the core 14. Jurisch, col. 2, lines 63-68; fig. 1. Jurisch does not teach the conductive stud 40 between an electrical contact pad and an insulating layer.

CLAIM 17

Claim 17 recites all of the limitations of claim 1, as well as a magnetic recording disk, a spin-valve sensor, an actuator, and a detector electrically coupled to the spin-valve sensor. Although the Examiner states that it would have been obvious to provide the magnetic head of Takeura with a GMR sensor, it is not apparent where the Examiner is finding support that the inductive read write head of Jurisch could be combined with the MR head of Takeura to form a GMR head having the specific configuration of claim 17. Furthermore, the Examiner makes no effort to establish the source of disclosure or ordinary skill that would render obvious the magnetic recording disk, the actuator, or the detector electrically coupled to the spin-valve sensor, either individually or in combination with each other and the other limitations of claim 17.

CLAIM 23

Claim 23 recites a species of the magnetic head of claim 1. In particular, claim 23 recites an alumina undercoat layer and a layer of alumina interposed between the electrical contact pad and the alumina undercoat layer.

CLAIM 24

Claim 24 also recites a species of the magnetic head of claim 1. In particular, claim 24 recites an insulating undercoat layer comprising SiO2 and a layer of SiO2 interposed between the electrical contact pad and the insulating undercoat layer.

CLAIM 25

Claim 25 recites a method of reducing capacitance in a magnetic head that includes providing many of the components recited in claim 1. In particular, claim 25 recites providing a substrate, an insulating layer, a read/write head, and a material selected to have a low dielectric constant between the pad and the insulating layer. The Examiner fails to provide any references or information that would render the method of claim 25 obvious.

Given that independent claims 1, 16, 17, 23, 24, and 25 are patentable, Appellants respectfully assert that dependent claims 2-15 and 18-21 are also patentable as depending from independent claims 1 and 17, respectfully. Additionally, these dependent claims are further considered allowable on their own merits as they recite other features which are neither taught nor suggested by the applied references.

CLAIM 2

Regarding the rejection of claim 2, the Examiner conclusively states that the low dielectric material 13 of Takeura is configured *to decrease the parasitic capacitance of the magnetic head.* Final Office Action, 03/24/04, page 2 (emphasis added). Yet, Takeura makes no reference to providing the layer 13 to reduce parasitic capacitance. In fact, Takeura is directed to a different problem than the present invention. Takeura attempts to reduce thermal noise and therefore increases the signal-to-noise ratio. Takeura, col. 1, lines 40-42; col. 2, lines 31-35. Takeura does this by reducing the second gap. Takeura, col. 1, line 62 through col. 2, line1. Jurisch is also directed to a different problem. Jurisch teaches that stray capacitance is reduced by shorting the substrate 12 and the core 14. Nevertheless, this does not solve the problem of the present invention of stray capacitance between the contacts 610 and the substrate 614. Indeed,

nowhere does Takeura or Jurisch state that a low dielectric material is used to decrease parasitic capacitance, as recited in claim 2.

CLAIM 3

With regard to the rejection of claim 3, Jurisch is cited for the prospect of a stud formed through the low dielectric material. As the claimed low dielectric material is interposed between the underlayer and a contact pad, the stud 40 of Jurisch must pass through a low dielectric material that is different than an underlayer. Yet, the only stud 40 in Jurisch passes through the base coat layer 36, which is clearly an underlayer. It does not pass through any other layer.

Furthermore, the stud 40 of Jurisch is used for a different purpose than the stud recited in claim 3. The stud of claim 3 is used to increase the distance between the contact pads 610 and the substrate 614 and to allow the low dielectric material 602 to be interposed between the contacts 610 and the undercoat layer 608. The stud 40 of Jurisch is used to form a short circuit between the substrate 12 and the core 14. Jurisch col. 3, lines 63-67. Using the stud 40 of Jurisch to pass through the dielectric layer would destroy the utility of the present application, as it would cause a short between the contact lead and the active elements of the magnetic head to which the contact lead connects. Combining the teachings of Jurisch with Takeura would similarly destroy the utility of Takeura, which is an impermissible combination of references, as references are not properly combinable where a proposed modification would render one of the references unsuitable for its intended purpose. *In re Gordon,* 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). If the Examiner proposes passing the stud 40 through different layers from those shown in Jurisch, a proper teaching for doing so other than impermissible hindsight must be given.

Given that dependent claim 3 is patentable, Appellants respectfully assert that dependent claims 4 and 5 are also patentable as depending from dependent claim 3, which depends from patentable independent claim 1.

CLAIM 6

With regard to claim 6, the Examiner fails to cite any component in the prior art that teaches the use of hard-bake photoresist for use as the low dielectric material interposed between the contact pad and the insulating undercoat. The Examiner seems to state that this element is functional and can be dismissed. Nevertheless, photoresist is a definite structure and to claim

photoresist is to claim a structure, not a function. To specifically claim hard-bake photoresist is merely a way to claim photoresist having a cured state. Doing so is once again defining structure because cured photoresist is a different structure from uncured photoresist. Yet, the Office Action does not make reference to photoresist of any type whatsoever and, consequently, has not made a proper *prima facie* case of obviousness for claim 6.

CLAIM 7

With regard to claim 7, the Office Action states that the low dielectric material is disclosed as being SiO2. Nevertheless, the cited passage, col. 10, lines 52-55, refers to a first and second head gap, not to an equivalent of the recited claim limitation. In fact, the Examiner fails to provide any reference to a low dielectric material that comprises SiO2. This failure is understandable given that the cited references, generally, do not disclose, teach, or suggest a low dielectric material as claimed in the present application, as described above.

CLAIMS 8-12

Regarding claims 8-12, the Office Action states that it would have been obvious to have made the cited thickness and constant of the low dielectric material in order to provide a head that corresponds with the magnetization reversal interval. Final Office Action, 03/24/04, page 4. The Examiner cites Takeura, col. 3, lines 39-47. The cited reference, however, is inapplicable to the particular selections of thicknesses and dielectric constant of claims 8-12. No further explanation is provided by the Examiner.

CLAIM 13

Regarding claim 13, the Examiner fails to support the conclusion that the inductive read write head of Jurisch could be combined with the MR head of Takeura to form a GMR head having the specific configuration of claim 13.

CLAIM 14

With regard to claim 14, the Examiner fails to address the limitation that the low dielectric material provides a platform for the electrical contact pad. The Office Action does not have any references or offer any explanation addressing this limitation recited in claim 14.

CLAIM 15

Claim 15 has never been addressed by the Examiner. Claim 15 recites an electrical contact pad having a surface area of less than about 20 μm in order to reduce capacitance

coupling with the substrate. Appellants noted in response to each of the first and Final Office Actions that the Examiner failed to assert any reasons for rejecting claim 15. Specifically, in response to the Final Office Action, Appellants stated, "[C]laim 15 has not been discussed in the office action, as was pointed out in the last response. Claim 15 is directed to the contact pad and recites a reduced area contact pad that reduces capacitance coupling with the substrate. Claim 15 is believed to be allowable, and no reasons for rejecting claim 15 have been given." The Examiner failed to address claim 15 in the Final Office Action and no reason has ever been provided for the rejection.

CLAIM 18

Claim 18, which depends from independent claim 17, recites a stud formed through the low dielectric material. As discussed above, the stud 40 of Jurisch is dissimilar to the stud of the present application.

CLAIM 19

Claim 19 recites that the low dielectric material is configured to decrease the parasitic capacitance of the magnetic head. As discussed above, the cited references do not address disclose, teach, or suggest a low dielectric material to decrease capacitance, as recited in claim 19.

CLAIM 20

Claim 20 recites a thickness range of the low dielectric material. As discussed above, the Examiner fails to provide any relevant reference or explanation to support this rejection.

CLAIM 21

Claim 21 recites a GMR sensor. As discussed above, the Examiner fails to support the conclusion that the inductive read write head of Jurisch could be combined with the MR head of Takeura to form a GMR head having the specific configuration of claim 21.

Given that the Examiner fails to establish a *prima facie* case of obviousness for any of the independent claims 1, 16, 17, 23, 24, or 25 or the dependent claims 2-15 or 18-20, Appellants respectfully submit that claims 1-21 and 23-25 are patentable over the cited references.

Additionally, Appellants respectfully assert that neither Takeura nor Jurisch, alone or in combination, teaches or suggests the contact pad having a surface area less than about 20 μm as claimed in independent claim 22 of the present application.[2] The Examiner has simply not provided any prior art references or explanation with regard to the rejection of independent claim 22. The Final Office Action does state that it would have been obvious to specify the thickness of the dielectric material and contact pads (which statement Appellants submit is erroneous), but the Examiner never addresses the surface area of the contact pad. Given that the Office Action does not show any teaching or suggestions regarding the surface area dimensions within the applied references, Appellants respectfully assert that the Examiner failed to establish a *prima facie* case of obviousness with respect to independent claim 22. Therefore, Appellants submit that independent claim 22 is patentable over the cited references.

II. The Examiner failed to establish a *prima facie* case of anticipation under 35 U.S.C. § 102(b) for Claims 1-3, 5-7, 14, 16, and 23-25 where the limitations of the claims are not taught by the cited reference.

The corresponding part of the Appeal Brief of November 17, 2006, to the extent it may be applicable, is incorporated by reference. For the Board's convenience, the relevant portion of the Appeal Brief of November 17, 2006 is included here, with the addition of some subheadings.

CLAIMS 1, 16, 23, 24, AND 25

Appellants respectfully assert that Huai fails to teach all the elements of independent Claims 1, 16, 23, 24, and 25. Specifically, Huai fails to teach the electrical contact pad recited in the claims. Furthermore, even if *arguendo* Huai did explicitly or inherently disclose an electrical

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[2] A similar claim limitation is included in dependent claim 15, which depends from independent claim 1. As discussed previously in the body of this brief, Appellants noted in response to each of the first and Final Office Actions that the Examiner failed to assert any reasons for rejecting claim 15. Specifically, in response to the Final Office Action, Appellants stated, "[C]laim 15 has not been discussed in the office action, as was pointed out in the last response. Claim 15 is directed to the contact pad and recites a reduced area contact pad that reduces capacitance coupling with the substrate. Claim 15 is believed to be allowable, and no reasons for rejecting claim 15 have been given." Similarly, Appellants respectfully submit that no reasons have been given for rejecting independent claim 22, which includes a similar limitation.

contact pad, Huai fails to teach the insulating undercoat and low dielectric material positioned, relative to the electrical contact pad, as recited in the claims.

A. The Electrical Contact Pad

Embodiments and representations of the electrical contact pads are shown in Figures 2 (items 206 and 218), 5 (items 502), and 6 (items 606 and 610) of the present application. These read/write contact pads provide locations at which electrical leads may be connected at the read/write head. This exemplary connectivity function is depicted in Figure 5, which represents the contact pads 502 as connection points for the various lead wires (not shown), e.g. W+, W-, R+, and R-. Furthermore, Figures 2, 5, and 6 each depict the contact pads as being separate from the magnetoresistive (MR) coil. These contact pads are particularly distinct from any electrical windings within the MR coil.

The Office Action states that Huai discloses an electrical pad 36, but this mischaracterizes the Huai disclosure. Item 36 of Huai is an electrical feedthrough that connects the lower and upper inductive coils 32A, 32B together. Huai, Fig. 5; col. 4, lines 12-17. Therefore, the electrical feedthrough 36 is an intrinsic part of the coil structure, providing a serial connection between the lower and upper coils 32A, 32B. In fact, the electrical feedthrough is nothing more than a part of the two coil layers 32A, 32B.

As described in Huai, the lower coils 32A, including the lower portion of the electrical feedthrough 36, are formed during the electroplating process shown in Figure 6L. Subsequently, the upper coils 32B, including the upper portion of the electrical feedthrough 36, are formed during a substantially similar electroplating process shown in Figure 6O. The upper portion of the electrical feedthrough 36 is physically deposited on the lower portion of the electrical feedthrough 36 via the feedthrough 62 void shown in Figure 6N. See, Huai, col. 5, lines 40-67. Therefore, it is clear that the electrical feedthrough 36 is not anticipatory of the electrical contact pad of the present application because it is an integral part of the coil structure and does not function to connect lead wires to the MR head. Rather, the electrical feedthrough 36 simply connects the lower coils 32A to the upper coils 32B. See Huai, col. 5, lines 59-62.

B. The Insulating Undercoat

The Office Action states that Huai discloses an insulating alumina undercoat 56, but this also mischaracterizes the Huai disclosure. Item 56 of Huai is only described as a protective

layer. Huai, col. 5, lines 23-30. While Huai does explain that a slurry of alumina or silicon dioxide may be used for gross removal of excess protective layer material, Huai does not disclose the composition of the protective material itself. In other words, Huai describes a protective material 56 and a separate slurry that may be used to conduct preliminary leveling of the protective layer before fine leveling by ion milling. The alumina slurry, however, is distinct from the protective material 56, which has an undisclosed composition. Therefore, the protective material 56 does not anticipate the insulating undercoat of the present application because its composition and insulating properties, if any, are undisclosed. Furthermore, Huai fails to teach or disclose that the layer 56 is "interposed between the pad and the substrate" as recited in Claim 1. As explained above, item 36 is not a contact pad. Instead, the electrical feedthrough 36 is an intrinsic part of the coil structure.

C. The Low Dielectric Material

The Office Action states that Huai discloses a material 60 & 66 selected to have a low dielectric constant interposed between the pad 36 and the insulating alumina undercoat 56. As described above, the Office Action's references to a "pad 36" and an "insulating alumina undercoat 56" are not supported by Huai. Nevertheless, even if *arguendo* the electrical feedthrough 36 were a contact pad and the protective layer 56 were an insulating undercoat, Huai still fails to disclose a low dielectric material interposed between the electrical feedthrough 36 and the protective layer 56.

Rather, Huai specifically discloses the opposite configuration—Huai describes and shows the electrical feedthrough 36 interposed between the dielectric material 66 and the protective layer 56. See Huai Figures 5 and 6S. The dielectric layer 60 is on the side of the electrical feedthrough 36, also interposed between the dielectric material 66 and the protective layer 56. Appellant notes that Figure 6S illustrates the feedthrough 36 using two layers of cross-hatch to explain the manufacturing process, but together these layers form the feedthrough 36. There is no way to accurately describe the configuration shown in Figure 5 of Huai to support the Office Action's assertion that either of the dielectric materials 60, 66 is interposed between the electrical feedthrough 36 and the protective layer 56 because the electrical feedthrough 36 and protective layer 56 are immediately adjacent to one another. See Huai Figure 6S. Therefore, the dielectric

materials 60, 66 do not anticipate the low dielectric material interposed between the pad and the substrate.

For the reasons stated above, Huai fails to teach all of the elements recited in the independent Claims 1, 16, 23, 24, and 25. In particular, Huai fails to teach the recited electrical contact pad, the insulating undercoat, and the low dielectric material. Accordingly, the Office Action fails to establish a *prima facie* case of anticipation because the cited reference fails to teach every element of these claims. Given that the cited reference fails to teach all of the elements recited in Claims 1, 16, 23, 24, and 25, Applicant respectfully submits that independent Claims 1, 16, 23, 24, and 25 are patentable over the cited reference. Consequently, Applicant requests that the rejection of Claims 1, 16, 23, 24, and 25 under 35 U.S.C. § 102(b) be withdrawn.

CLAIMS 2-15

Given that dependent Claims 2-15 depend from Claim 1, Applicant respectfully submits that Claims 2-15 are also patentable over the cited reference. Accordingly, Applicant requests that the rejection of dependent Claims 2-3, 5-7, and 14 under 35 U.S.C. § 102(b) be withdrawn. Furthermore, Applicant requests that the rejection of dependent Claims 4, 8-13, and 15 under 35 U.S.C. § 103(a) also be withdrawn.

III. The Examiner failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for Claims 4, 8-13, 15, and 17-22 where the limitations of the claims are not taught or suggested within the combination of cited references.

The corresponding part of the Appeal Brief of November 17, 2006, to the extent it may be applicable, is incorporated by reference. For the Board's convenience, the relevant portion of the Appeal Brief of November 17, 2006 is included here, with the addition of some subheadings.

CLAIMS 17 AND 22

Appellants respectfully assert that Huai fails to teach or suggest all the elements of independent Claims 17 and 22. Specifically, as explained above, Huai fails to teach or suggest the electrical contact pad recited in the claims. Furthermore, even if *arguendo* Huai explicitly or

inherently discloses an electrical contact pad, Huai fails to teach or suggest the low dielectric material interposed between the electrical contact pad and the substrate, as recited in Claim 17. Furthermore, Huai fails to teach or suggest a surface area characteristic of the electrical contact pad, as recited in Claim 22.

As described above, with regard to the rejections under 35 U.S.C. § 102(b), Huai fails to teach an electrical contact pad or a low dielectric material, as recited in Claim 17. Specifically, the electrical feedthrough 36 of Huai does not anticipate the electrical contact pad of the present application. Furthermore, the dielectric materials 60, 66 do not anticipate the low dielectric material of the present invention.

CLAIMS 15 AND 22

With regard to the surface area of the electrical contact pad recited in Claims 15 and 22, the Office Action completely fails to provide any support for the assertion of obviousness. Even if *arguendo* the electrical feedthrough 36 of Huai were an electronic contact pad, as recited in the Claims, Huai still does not make obvious the surface area of the electrical feedthrough 36. In fact, Huai is silent as to the surface area of the electrical feedthrough 36 and provides absolutely no particular guidance as to the design, shape, or dimensions of the electrical feedthrough 36.

Moreover, the Office Action fails to provide any motivation to modify the electrical feedthrough 36 of Huai to have a particular surface area. The Office Action only states that modifying the electrical feedthrough 36 so that it has a surface area of less than 20 μm would "optimize the electrical properties of the [electrical feedthrough 36] and decrease any unwanted interference." This motivation is not present in Huai.

The Examiner appears to improperly take Official Notice of this assertion, but fails to comply with the requirements for Official Notice. Specifically, the assertion is not shown to be well-known or common knowledge in the art and the brief, conclusory statement fails to provide a clear and unmistakable technical line of reasoning, as required by MPEP § 2144.04. If the Examiner maintains this assertion, Applicant requests that the Examiner provide evidence to show that modifying the electrical feedthrough 36 of Huai to have a surface area of less than 20 μm would in fact "optimize the electrical properties of the [electrical feedthrough 36] and decrease any unwanted interference." Without the proper evidentiary support for this conclusory

assertion, the Examiner is understood to have improperly relied on impermissible hindsight to produce an otherwise unsupported motivation to modify the cited reference.

For the reasons stated above, Huai fails to teach or suggest all of the elements recited in the independent Claims 17 and 22. In particular, Huai fails to teach or suggest the recited electrical contact pad and the low dielectric material. Huai also fails to teach or suggest the surface area characteristic of the electrical contact pad. The Examiner also fails to show adequate motivation to modify Huai.

Accordingly, the Office Action fails to establish a *prima facie* case of obviousness because the cited reference fails to teach every element of these claims or show a suggestion or motivation to modify the cited reference. Given that the cited reference fails to teach all of the elements recited in Claims 17 and 22, Applicant respectfully submits that independent Claims 17 and 22 are patentable over the cited reference. Consequently, Applicant requests that the rejection of Claims 17 and 22 under 35 U.S.C. § 103(a) be withdrawn.

CLAIMS 18-21

Given that dependent Claims 18-21 depend from Claim 17, Applicant respectfully submits that Claims 18-21 are also patentable over the cited reference. Accordingly, Applicant requests that the rejection of dependent Claims 18-21 under 35 U.S.C. § 103(a) be withdrawn.

IV. The Examiner failed to establish a *prima facie* case of anticipation under 35 U.S.C. § 102(b) for claims 16 and 24 where the limitations of the claims are not taught by the cited reference.

Appellants respectfully assert that Takeura II fails to teach or suggest all the elements of independent Claims 16 and 24. Specifically, Takeura II fails to teach or suggest a low dielectric material interposed between the pad and the substrate as recited in the claims. Also, Takeura II fails to teach or suggest an insulating undercoat layer as recited in the claims.

A. The Low Dielectric Material

CLAIM 16

Claim 16 recites a low dielectric material comprising hard bake photo resist. The Examiner does not assert that Takeura II teaches or suggests the use of hard bake photo resist as a

low dielectric material. On the contrary, the structure in Takeura II that the Examiner correlates with the low dielectric material is described by the Examiner as "Material 18, alumina" (Office Action, Page 2, Paragraph 3). Takeura II describes the same structure as "an alumina film formed as a protective film 18" (Takeura II, Column 9, Lines 61-62). Since the structure referenced by the Examiner as a low dielectric material is clearly described as alumina rather than hard bake photo resist, the Examiner has not established a limitation recited in the claim, Takeura II does not anticipate independent Claim 16.

Furthermore, or in the alternative, Claim 16 recites a low dielectric material interposed between the pad and the substrate having a thickness of 20 μm. The Examiner does not assert that Takeura II teaches or suggests a low dielectric material interposed between the pad and the substrate having a thickness of 20 μm. As described above, the Examiner has asserted that structure 18 in Takeura II correlates with the low dielectric material. Takeura II describes structure 18 as having a thickness of 60 μm (Takeura II, Column 9, line 62). Since the structure referenced by the Examiner as a low dielectric material is clearly described as having a thickness of three times the thickness recited in the claims, the Examiner has not established a limitation recited in the claim. Therefore, Takeura II does not anticipate independent Claim 16.

In addition, or in the alternative, Claim 16 recites a low dielectric material interposed between the pad and the substrate having a dielectric constant of about 3. The Examiner does not assert that Takeura II teaches or suggests a low dielectric material interposed between the pad and the substrate having a dielectric constant of about 3. As described above, Takeura II describes structure 18 as comprising alumina. Alumina has a dielectric constant of about 10 (see, http://www.matweb.com/search/SpecificMaterial.asp?bassnum=BA1A). Since the structure referenced by the Examiner as a low dielectric material is clearly described as alumina, which has a dielectric constant of more than three times the dielectric constant recited in the claim, the Examiner has not established a limitation recited in the claim. Therefore, Takeura II does not anticipate independent Claim 16.

CLAIM 24

Claim 24 recites a layer of SiO2 interposed between the electrical contact pad and the insulating undercoat layer. The Examiner does not assert that Takeura II teaches or suggests recites a layer of SiO2 interposed between the electrical contact pad and the insulating undercoat

layer. Since the Examiner has not established a limitation recited in the claim, Takeura II does not anticipate independent Claim 24.

Accordingly, the Office Action fails to establish a *prima facie* case of anticipation because Takeura II fails to teach each and every element of Claims 16 and 24, Appellant respectfully submits that independent Claims 16 and 24 are patentable over the cited reference. Consequently, Appellant requests that the rejection of Claims 16 and 24 under 35 U.S.C. § 102(b) be withdrawn.

B. The Insulating Undercoat Layer

Claim 24 recites an insulating undercoat layer comprising SiO2 formed over the substrate. The Examiner does not assert that Takeura II teaches or suggests the use of insulating undercoat layer comprising SiO2. On the contrary, the structure in Takeura II that the Examiner correlates with the insulating undercoat layer is described by the Examiner as "an insulating alumina undercoat 16" (Office Action, Page 2, Paragraph 2). Since the structure referenced by the Examiner as an insulating undercoat layer is clearly described as alumina rather than SiO2, the Examiner has not established a limitation recited in the claim, Takeura II does not anticipate independent Claim 24.

Accordingly, the Office Action fails to establish a *prima facie* case of anticipation because Takeura II fails to teach each and every element of Claim 24, Appellant respectfully submits that independent Claim 24 is patentable over the cited reference. Consequently, Appellant requests that the rejection of Claim 24 under 35 U.S.C. § 102(b) be withdrawn.

V. The Examiner failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claims 6 and 7 where the limitations of the claims are not taught or suggested within the combination of cited references.

Appellants respectfully assert that that Takeura in view of Huai fails to teach or suggest all the elements of Claims 6 and 7. Specifically, Takeura II and Huai fail to teach or suggest all the elements of Claims 6 and 7. Furthermore, if, *arguendo*, Takeura II and Huai do include the elements of Claims 6 and 7, the Office Action impermissibly uses hindsight to combine the references.

CLAIMS 6 AND 7

Claims 6 and 7 recite a low dielectric material comprising hard-bake photo resist and SiO2, respectively. Both claims depend from Claim 1, which defines the low dielectric material as being "interposed between the pad and the insulating undercoat." As the Office Action states, "Takeura [II] is silent as to the low dielectric material being either hard bake photo resist or SiO2." (Office Action, Page 3, fourth paragraph).

The Office Action states that Huai discloses "the low dielectric material 60 & 66 can be substitute [sic] with a hard bake photo resist. Column 5, lines 53-57 Huai et al [sic] discloses that the low dielectric material includes SiO_2." (Office Action, Page 3, paragraph 5). The Office Action goes on to state that the substitution of alumina for either SiO_2 or hard bake photo resist would have been obvious "because the materials are art recognized equivalents." (Office Action, Page 4, first partial paragraph).

The Examiner appears to improperly take Official Notice of this assertion, but fails to comply with the requirements for Official Notice. Specifically, the assertion is not shown to be well known or common knowledge in the art, and the brief, conclusory statement fails to provide a clear and unmistakable technical line of reasoning as required by MPEP § 2144.04. If the Examiner maintains this assertion, Appellant requests that the Examiner provide evidence to show that modifying low dielectric material in Takeura II to comprise SiO_2 or hard bake photo resist for a low dielectric material interposed between the pad and the insulating undercoat was well known or common knowledge in the art at the time of the invention of Appellants. Without the proper evidentiary support for this conclusory assertion, the Examiner is understood to have improperly relied on impermissible hindsight to produce an otherwise unsupported motivation to modify the cited reference.

As described in Appellants' application, the various materials used as exemplary for the low dielectric material have a different dielectric constant, and the use of a material with a different dielectric constant impacts the amount of high frequency interference picked up by the magnetic head. Selection of a material with a particular dielectric constant, therefore, impacts the other aspects of the design of the magnetic head, such as the optimal thickness of various components. (Published Application, Publication No. 2003/0165034, paragraphs 0037-0039). Materials with differing dielectric constants are therefore not equivalent.

In addition, the Office Action mischaracterizes the motivation for selecting a low dielectric material. As stated in the Appeal Brief of November 11, 2006, structures 60 and 66 of Huai are in a different location in relation to other components, and serve a different purpose than the low dielectric material of Claims 6 and 7. Specifically, structure 60 in Huai is on the side of an electrical feedthrough 36, and interposed between the dielectric material 66 and a protective layer 56. Structure 66 is situated between layers of a coil. None of these configurations can be described as being "interposed between the pad and the insulating undercoat" as described in the claims of Appellants' invention. By describing the use of SiO_2 or hard bake photo resist as a substitute, Huai is disclosing the applicability of these materials for use in insulating a coil, not for use in separating contact pads from a substrate to reduce the high frequency interference picked up by read elements of a magnetic head as disclosed by the Appellants' invention.

The Office Action, Takeura II, and Huai are all silent on the impact the dielectric constant may have on the high frequency interference picked up by read elements of a magnetic head. Absent any suggestion that such a selection may reduce the high frequency interference picked up by read elements of a magnetic head, it would not have been obvious to one of ordinary skill in the art to select a material with a particular dielectric constant for such a purpose. Therefore, it would not have been obvious to one of skill in the art to modify a low dielectric material of Takeura II to comprise SiO_2 or hard bake photo resist.

Accordingly, the Office Action fails to establish a *prima facie* case of obviousness because the cited references fail to teach every element of these claims or show a suggestion or motivation to combine or modify the cited references. Given that the cited references fail to teach all of the elements recited in Claims 6 and 7, Appellants respectfully submit that Claims 6 and 7 are patentable over the cited references. Consequently, Appellants request that the rejection of Claims 6 and 7 under 35 U.S.C. § 103(a) be withdrawn.

VI. Whether the Examiner failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claims 9-12, 15, and 17-22 where the limitations of the claims are not taught or suggested within the cited reference.

Appellants respectfully assert that Takeura II fails to teach or suggest all the elements of independent Claims 9-12, 15, 20, and 22. Specifically, Takeura II fails to teach or suggest the low dielectric material recited in the claims. Furthermore, Takeura II fails to teach or suggest a surface area characteristic of the electrical contact pad as recited in the claims.

A. Low Dielectric Material

CLAIMS 9 and 20

Claims 9 and 20 recite a low dielectric material having a thickness in a range of between about 10 μm and about 50 μm. Claim 10 recites a low dielectric material having a thickness of about 20 μm. All three claims depend from a claim describing the low dielectric material as a material selected to have a low dielectric constant interposed between the pad and the insulating undercoat. As the examiner states, "Takeura [II] is silent as to the low dielectric material having a thickness in a range of between 10 μm and about 50 μm; or having a thickness of about 20 μm" (Office Action, Page 4, second full paragraph).

The Office Action fails to provide any motivation to modify a low dielectric material of Takeura II to have a thickness in a range of between 10 μm and about 50 μm or about 20 μm. The Office Action merely states that "one of ordinary skill in the art at the time the invention was made would have been motivated to specify a thickness range . . . which is well within the purview of a skilled artisan and absent an unobvious result, so as to effectively optimize the insulative properties of the dielectric material." (Office Action, Page 4, third full paragraph).

The Examiner appears to improperly take Official Notice of this assertion, but fails to comply with the requirements for Official Notice. Specifically, the assertion is not shown to be well known or common knowledge in the art, and the brief, conclusory statement fails to provide a clear and unmistakable technical line of reasoning as required by MPEP § 2144.04. If the Examiner maintains this assertion, Appellant requests that the Examiner provide evidence to show that modifying low dielectric material in Takeura II to have a thickness in a range of between about 10 μm and about 50 μm or about 20 μm to "optimize the insulative properties of

the dielectric material" was well known or common knowledge in the art at the time of the invention of Appellants. Without the proper evidentiary support for this conclusory assertion, the Examiner is understood to have improperly relied on impermissible hindsight to produce an otherwise unsupported motivation to modify the cited reference.

In addition, or in the alternative, the Office Action mischaracterizes the motivation for selecting a thickness for the low dielectric material. The purpose is not to "optimize the insulative properties of the dielectric material" as stated by the Office Action. The selection of a thickness is to cause "a reduction in high frequency interference picked up by the read elements" (published application, publication number 2003/0165034, paragraph 0038).

Neither Takeura II nor the Office Action suggest that the selection of a thickness of the low dielectric material may have an impact on the high frequency interference picked up by read elements of a magnetic head. Absent any suggestion that such a selection may reduce the high frequency interference picked up by read elements of a magnetic head, it would not have been obvious to one of ordinary skill in the art to select a thickness for such a purpose. Therefore, it would not have been obvious to one of skill in the art to modify a low dielectric material of Takeura II to have a thickness in a range of between 10 μm and about 50 μm or about 20 μm.

The Office action makes the same argument in relation to Claims 11 and 12. Claims 11 and 12 recite the low dielectric material having a dielectric constant of about 9 or about 3, respectively. Specifically, the Examiner states that "one of ordinary skill in the art at the time the invention was made would have been motivated to specify a . . . dielectric constant, which is well within the purview of a skilled artisan and absent an unobvious result, so as to effectively optimize the insulative properties of the dielectric material." (Office Action, Page 4, third full paragraph).

For the reasons stated above, this argument improperly takes Official Notice of this assertion. If the Examiner maintains this assertion, Appellant requests that the Examiner provide evidence to show that modifying low dielectric material in Takeura II to have a dielectric constant of about 9 or about 3 to "optimize the insulative properties of the dielectric material" was well known or common knowledge in the art at the time of the invention of Appellants. Without the proper evidentiary support for this conclusory assertion, the Examiner is understood

to have improperly relied on impermissible hindsight to produce an otherwise unsupported motivation to modify the cited reference.

Additionally, or in the alternative, for the reasons stated above, this argument mischaracterizes the motivation for selecting a material having a specific dielectric constant. Neither Takeura II nor the Office Action suggest that the selection of a low dielectric material with a dielectric constant of about 9 or about 3, or indeed, any particular dielectric constant, may have an impact on the high frequency interference picked up by read elements of a magnetic head. Absent any suggestion that such a selection may reduce the high frequency interference picked up by read elements of a magnetic head, it would not have been obvious to one of ordinary skill in the art to select a material for such a purpose. Therefore, it would not have been obvious to one of skill in the art to modify a low dielectric material of Takeura II to have a dielectric constant of about 9 or about 3.

B. Area of the Electrical Contact Pad

With regard to the surface area of the electrical contact pad recited in Claims 15 and 22, the Office Action completely fails to provide any support for the assertion of obviousness. Takeura II is silent as to the surface area of the electrical contact pad and provides no guidance as to the dimensions of an electrical contact pad.

Moreover, the Office Action fails to provide any motivation to modify an electrical contact pad of Takeura II to have a particular surface area. The Office Action merely states that "one of ordinary skill in the art at the time the invention was made would have been motivated to provide a contact pad with a specific surface area to effectively optimize the electrical properties of the contact pad and decrease any unwanted interference" (Office Action, Page 5, first full paragraph).

The Examiner appears to improperly take Official Notice of this assertion, but fails to comply with the requirements for Official Notice. Specifically, the assertion is not shown to be well known or common knowledge in the art, and the brief, conclusory statement fails to provide a clear and unmistakable technical line of reasoning as required by MPEP § 2144.04. If the Examiner maintains this assertion, Appellant requests that the Examiner provide evidence to show that modifying an electrical contact pad in Takeura II to have a surface area of less than 20 μm to, "optimize the electrical properties of the contact pad and decrease any unwanted

interference" was well known or common knowledge in the art at the time of the invention of Appellants. Without the proper evidentiary support for this conclusory assertion, the Examiner is understood to have improperly relied on impermissible hindsight to produce an otherwise unsupported motivation to modify the cited reference.

For the reasons cited above, Takeura II fails to teach or suggest all of the elements recited in Claims 9-12, 15, 20, and 22. In particular Takeura II fails to teach or suggest the recited low dielectric material having the recited thickness or the recited dielectric constant and the surface area characteristic of the electrical contact pad. Accordingly, the Office Action fails to establish a *prima facie* case of obviousness because the cited reference fails to teach every element of these claims or show a suggestion or motivation to modify the cited reference. Given that the cited reference fails to teach all of the elements recited in Claims 9-12, 15, 20, and 22, Appellant respectfully submits that Claims 9-12, 15, 20, and 22 are patentable over the cited reference. Consequently, Appellant requests that the rejection of Claims 9-12, 15, 20, and 22 under 35 U.S.C. § 103(a) be withdrawn.

SUMMARY

In view of the foregoing, Claims 6-7, 9-12, 15-16, 20, 22, and 24 on appeal have been improperly rejected because the Examiner has not properly established a *prima facie* case of anticipation or a *prima facie* case of obviousness for Claims 6-7, 9-12, 15-16, 20, 22, and 24. Appellants submit that the foregoing arguments establish the novelty and non-obviousness of the claims over the cited references. Therefore, Appellants respectfully request reversal of the Examiner's rejections under 35 U.S.C. §§ 102(b) and 103(a). Furthermore, Appellants request allowance of pending Claims 6-7, 9-12, 15-16, 20, 22, and 24.

Respectfully submitted,

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8. CLAIM APPENDIX

The claims involved in the appeal, namely Claims 1-25, are listed below.

1. A magnetic head comprising:

an electrical contact pad;

a substrate on which the magnetic head is formed;

an insulating undercoat interposed between the pad and the substrate; and

a material selected to have a low dielectric constant interposed between the pad and the insulating undercoat.

2. The magnetic head of claim 1, wherein the low dielectric material is configured to decrease the parasitic capacitance of the magnetic head.

3. The magnetic head of claim 1, further comprising a stud formed through the low dielectric material.

4. The magnetic head of claim 3, wherein the stud comprises Cu.

5. The magnetic head of claim 3, wherein the stud comprises a conductive material.

6. The magnetic head of claim 1, wherein the low dielectric material comprises hard-bake photo resist.

7. The magnetic head of claim 1, wherein the low dielectric material comprises SiO_2.

8. The magnetic head of claim 1, wherein the low dielectric material has a thickness in a range of between about 1 μm and about 100 μm.

9. The magnetic head of claim 1, wherein the low dielectric material has a thickness in a range of between about 10 μm and about 50 μm.

10. The magnetic head of claim 1, wherein the low dielectric material has a thickness of about 20 μm.

11. The magnetic head of claim 1, wherein the low dielectric material has a dielectric constant of less than about 9.

12. The magnetic head of claim 1, wherein the low dielectric material has a dielectric constant of about 3.

13. The magnetic head of claim 1, wherein the magnetic head carries a GMR sensor.

14. The magnetic head of claim 1, wherein the low dielectric material provides a platform for the electrical contact pad.

15. The magnetic head of claim 1, Further comprising an electrical contact pad having a surface area of less than about 20 μm in order to reduce capacitance coupling with the substrate.

16. A reduced capacitance magnetic head comprising:

an electrical contact pad;

a substrate on which the magnetic head is formed;

an insulating layer formed over the substrate;

a low dielectric material interposed between the pad and the substrate which is used as a platform for the electrical contact pad to increase the distance between the substrate and the electrical contact pad, the low dielectric material comprising hard bake photo resist and having a thickness of about 20 μm and a dielectric constant of about 3; and

a conducting stud formed through the low dielectric material to make electrical connection between the electrical contact pad and the insulating layer.

17. A disk drive system, comprising:

a reduced capacitance magnetic head comprising:

an electrical contact pad;

a substrate on which the magnetic head is formed;

an insulating undercoat interposed between the pad and the substrate;

a material selected to have a low dielectric constant interposed between the pad and the insulating undercoat; and

a magnetic recording disk;

a spin-valve sensor for reading data recorded on the recording disk; and

an actuator for moving the spin valve sensor across the magnetic recording disk in order for the spin-valve sensor to access different magnetically recorded data on the magnetic recording disk; and

a detector electrically coupled to the spin-valve sensor and configured to detect changes in resistance of the sensor caused by rotation of the magnetization of the sensing layer relative to the fixed magnetizations of the pinned layer in response to changing magnetic fields induced by the magnetically recorded data.

18. The disk drive system of claim 17, further comprising a stud formed through the low dielectric material.

19. The disk drive system of claim 17, wherein the low dielectric material is configured to decrease the parasitic capacitance of the magnetic head.

20. The disk drive system of claim 17, wherein the low dielectric material has a thickness in a range of between about 10 μm and about 50 μm.

21. The disk drive system of claim 17, wherein the magnetic head comprises a GMR sensor.

22. A reduced capacitance magnetic head comprising:

a substrate on which the magnetic head is formed; and

a contact pad disposed above the substrate and having a surface area less than about 20 μm in order to reduce capacitance coupling with the substrate.

23. A magnetic head comprising:

a substrate on which the magnetic head is formed;

an alumina undercoat layer comprising Al_2O_3 formed over the substrate;

an electrical contact pad; and

a layer of alumina interposed between the electrical contact pad and the alumina undercoat layer.

24. A magnetic head comprising:

a substrate on which the magnetic head is formed;

an insulating undercoat layer comprising SiO2 formed over the substrate;

an electrical contact pad; and

a layer of SiO2 interposed between the electrical contact pad and the insulating undercoat layer.

25. A method of reducing capacitance in a magnetic head, comprising:

providing a substrate;

providing an insulating layer directly over the substrate;

providing a read/write head; and

providing a material selected to have a low dielectric constant between the pad and the insulating layer for isolating the read/write head from the substrate in order to reduce the capacitance coupling between the read head and the substrate.

9. EVIDENCE APPENDIX

There is no material to be included in the Evidence Appendix.

10. RELATED PROCEEDINGS APPENDIX

There is no material to be included in the Related Proceedings Appendix.